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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/693,287
Filing Date: October 23, 2003
Appellant(s): AUFRANC ET AL.

Steven L. Nichols
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 7/1/2008 appealing from the Office action mailed 5/7/2008.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

No amendment after final has been filed.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

US 2003/0090597 A1	Katoh et al.	6-2001
US 6,407,726 B1	Endo et al.	12-1998
US 6, 680,748 B1	Monti	9-2001
US 5,581,302	Ran et al.	5-1995

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. Claims 1 – 4, 10 – 12, 17 – 22, 28 – 30, 35 – 38 and 44 – 46 are rejected under 35 U.S.C. 103(a) as being anticipated by Katoh et al. (Hereinafter "Katoh" US 2003/0090597) in view of Endo et al. (Hereinafter "Endo" US 6,407,726 B1).

Re claim 1, Katoh discloses a display system (Fig. 1) for displaying an interlaced image frame, said interlaced image frame comprising a top field (Odd numbered lines) and a bottom field (even numbered lines), said top and bottom fields each having lines of pixels, said system comprising (Para. 174):

an image processing unit configured to process a stream of pixel data elements sequentially corresponding to said pixels in said top and bottom fields and generate a number of image sub-frames (Para 24; "a circuit for generating data representing multiple image subframes from data representing each image frame." Para 176; "It should be noted that in the interlaced scanning technique, an image presented by a field may be processed similarly to an image frame.");

a modulator configured to generate a light beam bearing said number of image sub-frames (Para 24; "an image display panel including multiple pixel regions, each of which is able to modulate light); and

a wobbling device configured to displace said light beam such that each of said image sub-frames is spatially displayed offset from a previous image sub-frame (Para 24; “an image shifter for shifting, on the projection plane, a selected one of the multiple image subframes.);

wherein at least one of said image sub-frames is generated using only said pixel data elements in said top field and at least one of said image sub-frames is generated using only said pixel data elements in said bottom field. (Since each field is processed in the similar manner to a frame as explained above, it is inherent that the sub-frames will be generated from said top and bottom fields.)

But does not expressly teach wherein the sub-frames are spatially displayed offset from a previous image sub-frame by an offset distance less than a pixel width.

However, Endo teaches a display device having discrete fixed pixels and wobbling elements for wobbling a light beam emitted from the display elements for an interlaced display system wherein a sub-frame is displayed offset from a previous image sub-frame by an offset distance less than a pixel width (Endo: Col. 3, lines 1 – 10. See Fig. 3).

Therefore, taking the combined teachings of Katoh and Endo, as a whole, it would have been obvious to a person having ordinary skill in the art to incorporate the idea of having a wobbling method wherein the sub-frames are shifted less than a pixel width to achieve an oblique wobbling method as taught by Endo into the display system as taught by Katoh to obtain a display system for displaying an interlaced image wherein wobbling elements wobble image sub-frames to display the sub-frames offset

from a previous image sub-frame by an offset distance less than a pixel width to achieve oblique wobbling to increase horizontal and vertical shifting of the pixels to achieve higher resolution for the NTSC system of the HD system (Endo: Col. 1, lines 43 – 64).

Re claim 2, Katoh discloses the system of claim 1, wherein said image processing unit is configured to process said pixel data elements in said top field to generate a first image sub-frame and said pixel data elements in said bottom field to generate a second image sub-frame (Para 26; "the image subframes that make up an $n+1^{st}$ image frame are shifted on the projection plane." Multiple subframes are generated from an image frame, in which each image frame would consist of a sub-frame. The first image frame (1st) consisting a "first image sub-frame," and the second image frame ($n+1^{st}$) consisting a "second image sub-frame.")

Claim 3 recites limitations that have been covered in claim 2. Therefore, it has been analyzed and rejected w/r to claim 2.

Re claim 4, Katoh discloses the system of claim 3, wherein said offset distance comprises a vertical offset distance and a horizontal offset distance, said second image sub-frame location being vertically offset from said first image sub-frame location by said vertical offset distance and horizontally offset from said first image sub-frame location by said horizontal offset distance (Para 197; "The direction in which the shift Ax

of a light beam is created (which will be herein referred to as a “shifting direction") is the vertical direction of the image. The shifting direction of the light beam may also be the horizontal direction or a diagonal direction of the image.”).

Re claim 10, Katoh discloses the system of claim 1, wherein said image processing unit is configured to:

process said pixel data elements in said top field to generate a first image sub-frame and a second image sub-frame;

and process said pixel data elements in said bottom field to generate a third image sub-frame and a fourth image sub-frame (Para 27; “the number of image subframes that make up each image frame is two.”)

Re claim 11, Katoh discloses the system of claim 10, wherein:

said first image sub-frame is displayed in a first image sub-frame location;

said second image sub-frame is displayed in a second image sub-frame location;

said third image sub-frame is displayed in a third image sub-frame location; and

said fourth image sub-frame is displayed in a fourth image sub-frame location (Para 37; “the motion pattern includes shifting the image sub-frame to four or more different locations that are arranged in line.”).

Claim 12 recites limitations that have been covered in claims 2 and 10. Therefore, it has been analyzed and rejected w/r to claim 2 and 10.

Re claim 17, Katoh discloses the system of claim 1, further comprising display optics configured to display said light beam on a viewing surface. (Abstract)

Re claim 18, Kato teaches a method of displaying an interlaced image frame, said interlaced image frame comprising a top field and a bottom field, said top and bottom fields each having lines of pixels (Para. 174), said method comprising: processing a stream of pixel data elements sequentially corresponding to said pixels in said top and bottom fields and generating a number of image sub-frames corresponding to said top and bottom fields; and displaying each of said image sub-frames offset from a previous image sub-frame (Para 24; "a circuit for generating data representing multiple image subframes from data representing each image frame." Para 176; "It should be noted that in the interlaced scanning technique, an image presented by a field may be processed similarly to an image frame.").

But does not expressly teach wherein the sub-frames are spatially displayed offset from a previous image sub-frame by an offset distance less than a pixel width.

However, Endo teaches a display device having discrete fixed pixels and wobbling elements for wobbling a light beam emitted from the display elements for an interlaced display system wherein a sub-frame is displayed offset from a previous image sub-frame by an offset distance less than a pixel width (Endo: Col. 3, lines 1 – 10. See Fig. 3).

Therefore, taking the combined teachings of Katoh and Endo, as a whole, it would have been obvious to a person having ordinary skill in the art to incorporate the idea of having a wobbling method wherein the sub-frames are shifted less than a pixel width to achieve an oblique wobbling method as taught by Endo into the display system as taught by Katoh to obtain a method for a display system displaying an interlaced image wherein wobbling elements wobble image sub-frames to display the sub-frames offset from a previous image sub-frame by an offset distance less than a pixel width to achieve oblique wobbling to increase horizontal and vertical shifting of the pixels to achieve higher resolution for the NTSC system of the HD system (Endo: Col. 1, lines 43 – 64).

Claim 19 recites limitations that have been covered in claim 1. Therefore, it has been analyzed and rejected w/r to claim 1.

Claim 20 recites limitations that have been covered in claim 2. Therefore, it has been analyzed and rejected w/r to claim 2.

Claim 21 recites limitations that have been covered in claim 3. Therefore, it has been analyzed and rejected w/r to claim 3.

Claim 22 recites limitations that have been covered in claim 4. Therefore, it has been analyzed and rejected w/r to claim 4.

Claim 28 recites limitations that have been covered in claim 10. Therefore, it has been analyzed and rejected w/r to claim 10.

Claim 29 recites limitations that have been covered in claim 11. Therefore, it has been analyzed and rejected w/r to claim 11.

Claim 30 recites limitations that have been covered in claim 12. Therefore, it has been analyzed and rejected w/r to claim 12.

Claim 35 recites limitations that have been covered in claim 17. Therefore, it has been analyzed and rejected w/r to claim 17.

Re claim 36, Katoh teaches a system for displaying an interlaced image frame, said interlaced image frame comprising a top field and a bottom field, said top and bottom fields each having lines of pixels (Para. 174), said system comprising: means for processing a stream of pixel data elements sequentially corresponding to said pixels in said top and bottom fields and generating a number of image sub-frames corresponding to said top and bottom fields; and means for displaying each of said image sub-frames offset from a previous image sub-frame (Para 24; “a circuit for generating data representing multiple image subframes from data representing each image frame.”

Para 176; "It should be noted that in the interlaced scanning technique, an image presented by a field may be processed similarly to an image frame.").

But does not expressly teach wherein the sub-frames are spatially displayed offset from a previous image sub-frame by an offset distance less than a pixel width.

However, Endo teaches a display device having discrete fixed pixels and wobbling elements for wobbling a light beam emitted from the display elements for an interlaced display system wherein a sub-frame is displayed offset from a previous image sub-frame by an offset distance less than a pixel width (Endo: Col. 3, lines 1 – 10. See Fig. 3).

Therefore, taking the combined teachings of Katoh and Endo, as a whole, it would have been obvious to a person having ordinary skill in the art to incorporate the idea of having a wobbling method wherein the sub-frames are shifted less than a pixel width to achieve an oblique wobbling method as taught by Endo into the display system as taught by Katoh to obtain a display system for displaying an interlaced image wherein wobbling elements wobble image sub-frames to display the sub-frames offset from a previous image sub-frame by an offset distance less than a pixel width to achieve oblique wobbling to increase horizontal and vertical shifting of the pixels to achieve higher resolution for the NTSC system of the HD system (Endo: Col. 1, lines 43 – 64).

Claim 37 recites limitations that have been covered in claim 1. Therefore, it has been analyzed and rejected w/r to claim 1.

Claim 38 recites limitations that have been covered in claim 2. Therefore, it has been analyzed and rejected w/r to claim 2.

Claim 44 recites limitations that have been covered in claim 10. Therefore, it has been analyzed and rejected w/r to claim 10.

Claim 45 recites limitations that have been covered in claim 11. Therefore, it has been analyzed and rejected w/r to claim 11.

Claim 46 recites limitations that have been covered in claim 12. Therefore, it has been analyzed and rejected w/r to claim 12.

4. Claims 5, 23, and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over modified teachings of Katoh and Endo, as applied to claims 1 – 4, 10 – 12, 17 – 22, 28 – 30 and 35 – 38 above, and further in view of Monti (US 6,680,748).

Re claim 5, the modified teachings of Katoh and Endo disclose the system of claim 2.

But fail to expressly disclose said image processing unit, which is further configured to:

process every other pixel data element in said top field starting with a first pixel data element in said top field to generate said first image sub-frame; and

process every other pixel data element in said bottom field starting with a second pixel data element in said bottom field to generate said second image sub-frame.

However, Monti discloses a spatial resolution reduction process wherein the pixel values in every other block are read out so as to perform a spatial resolution reduction by a factor of 2. (Fig. 3D, Col. 11, lines 25 – 37)

Therefore, taking the combined teachings of Katoh, Endo and Monti, as a whole, it would have been obvious to a person having ordinary skill in the art to incorporate the display system as taught by Katoh and Endo to the spatial resolution process of Monti to obtain a display system processing unit which processes every other pixel data to generate image sub-frames to perform a spatial resolution reduction by a factor of 2.

Claim 23 recites limitations that have been covered in claim 5. Therefore, it has been analyzed and rejected w/r to claim 5.

Claim 39 recites limitations that have been covered in claim 5. Therefore, it has been analyzed and rejected w/r to claim 5.

5. Claims 6 – 9, 13 – 16, 24 – 27, 31 – 34, 40 – 43 and 47 - 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over modified teachings of Katoh and Endo, as applied to claims 1 – 4, 10 – 12, 17 – 22, 28 – 30, 35 – 38 and 44 – 46, and further in view of Ran et al. (US 5,581,302).

Re claim 6, the modified teachings of Katoh and Endo disclose the system of claim 2.

But fail to expressly disclose said image processing unit, which is further configured to:

average every two neighboring pixel data elements in each line of said top field starting with first and second pixel data elements in each line of said top field to generate said first image sub-frame;

and average every two neighboring pixel data elements in each line of said bottom field starting with second and third pixel data elements in each line of said bottom field to generate said second image sub-frame.

However, Ran et al. disclose a technique, two facing pels along a horizontal row are averaged together to perform a linear upsampling operation. (Ran: Col. 8, lines 4 - 15 Fig. 7B)

Therefore, taking the combined teachings of Katoh, Endo and Ran et al., as a whole, it would have been obvious to a person having ordinary skill in the art to incorporate the display system as taught by Katoh and Endo to the technique as

disclosed by Ran et al. to obtain a display system processing unit which averages every two neighboring pixel data elements to perform a linear upsampling operation.

Claim 7 -9 recite limitations that have been covered in claim 6. Therefore, they have been analyzed and rejected w/r to claim 6. With respect to said "linear function" in claim 9, see Ran: Col. 8 lines 5 – 14.

Claims 13 - 14 recite limitations that have been covered in claims 6 and 10. Therefore, it has been analyzed and rejected w/r to claim 6 and 10. (Also, see Ran: figure 7(B, C), 8(A, B))

Claim 15 recites limitations that have been covered in claims 8 and 12-14. Therefore, it has been analyzed and rejected w/r to claim 6 and 10.

Claim 16 recites limitations that have been covered in claims 9 and 12-14. Therefore, it has been analyzed and rejected w/r to claim 6 and 10.

Claim 24 recites limitations that have been covered in claim 6. Therefore, it has been analyzed and rejected w/r to claim 6.

Claim 25 recites limitations that have been covered in claim 7. Therefore, it has been analyzed and rejected w/r to claim 7.

Claim 26 recites limitations that have been covered in claim 8. Therefore, it has been analyzed and rejected w/r to claim 8.

Claim 27 recites limitations that have been covered in claim 9. Therefore, it has been analyzed and rejected w/r to claim 9.

Claim 31 recites limitations that have been covered in claim 13. Therefore, it has been analyzed and rejected w/r to claim 13.

Claim 32 recites limitations that have been covered in claim 14. Therefore, it has been analyzed and rejected w/r to claim 14.

Claim 33 recites limitations that have been covered in claim 15. Therefore, it has been analyzed and rejected w/r to claim 15.

Claim 34 recites limitations that have been covered in claim 16. Therefore, it has been analyzed and rejected w/r to claim 16.

Claim 40 recites limitations that have been covered in claim 6. Therefore, it has been analyzed and rejected w/r to claim 6.

Claim 41 recites limitations that have been covered in claim 7. Therefore, it has been analyzed and rejected w/r to claim 7.

Claim 42 recites limitations that have been covered in claim 8. Therefore, it has been analyzed and rejected w/r to claim 8.

Claim 43 recites limitations that have been covered in claim 9. Therefore, it has been analyzed and rejected w/r to claim 9.

Claim 47 recites limitations that have been covered in claim 13. Therefore, it has been analyzed and rejected w/r to claim 13.

Claim 48 recites limitations that have been covered in claim 14. Therefore, it has been analyzed and rejected w/r to claim 14.

Claim 49 recites limitations that have been covered in claim 15. Therefore, it has been analyzed and rejected w/r to claim 15.

Claim 50 recites limitations that have been covered in claim 16. Therefore, it has been analyzed and rejected w/r to claim 16.

(10) Response to Argument

With respect to the Appellant's argument regarding the concept of "wobulation," the Appellant alleges that the Final Office Action does not appear to apply the art-recognized concept of wobulation.

However, Examiner respectfully disagrees. The Appellant has provided the definition of "wobulation" from an online internet source called "Wikipedia," and thereby assumed the definition of "wobulation" provided on the website to be "art-recognized." Examiner respectfully asserts that "Wikipedia" is an informal website comprising information of various subjects which are added and edited by its users.

Therefore, Examiner respectfully asserts that the definition of "wobulation" from Wikipedia can not be considered to be "art-recognized."

Examiner respectfully acknowledges that the explanation of "wobulation" in Wikipedia to be similar to the "wobbling technique" as described in the specification of the current application. Examiner further asserts that the specific term "wobulation" is not mentioned or disclosed in the specification of the current application. Examiner appropriately interpreted the term "wobulation" to be a broad and reasonable grammatical derivation of the "wobbling" phenomenon as described in the specification. The specification describes, as the Appellant notes, in Para 0024, a "wobbling" device to be "a device that is configured to enhance image resolution and hide pixel inaccuracies."

The Appellant primarily argues on pages 10 - 12 of the Appeal Brief that Katoh does not teach "wobulation" as defined in Wikipedia. The Appellant recites in the argument on page 12 that "wobbling device **shifts** ("wobbling" is considered to be shifting of pixel positions as disclosed by the specification.) the pixels such that each **wobulation** (The term "wobulation" is not disclosed in the specification. The Appellant arbitrarily added the term.) sub-frame is displayed by the display optics (105) in a slightly different spatial position than the previously display image sub-frame.... This shifting results, as indicated, in the perception by the viewer of enhanced resolution..."

Further the Appellant alleges that "Katoh only teaches sub-frames shifted by whole pixel amounts, the Katoh system cannot create the appearance of enhanced resolution. Consequently, Katoh does not teach or suggest anything relevant to wobulation or to how wobulation sub-frames, as opposed to color component sub-frames are generated. Katoh has nothing to do with wobulation."

However, Examiner respectfully disagrees. As acknowledged by the Appellant above, Katoh teaches **shifting** ("wobbling") of sub-frames. Examiner respectfully asserts that Katoh teaches a system which shifts image sub-frames to increase the resolution of the image just as the Appellant described above. Katoh clearly teaches in Para 0180, "even though just one display panel is used in this embodiment, a full-color image can be displayed **at as high resolution and brightness** (emphasis added) as those realized by the three-panel type." Katoh clearly shows in Fig. 7, how the display subframes are shifted/wobbled to increase the resolution of the display. Without such

wobbling technique the resulting image resolution would be 1/3 of the display image. Fig. 5 shows such concept. (b) in Fig. 5 employees a single panel display which is 1/3 of the resolution of the 3 panel display of (a). Although (c) uses a single display panel, the display can achieve the equal resolution to the 3 panel display of (a) by wobbling (See Para 0177 – 01080).

The Appellant recites that the burden would be on Examiner to demonstrate that the color blending of Katoh would be understood by one of skill in the art to be an example of wobulation. Examiner thereby provided sufficient explanation above how Katoh describes wobulation which improves the display image by shifting subframes.

Therefore, Examiner respectfully reasserts that Katoh clearly teaches wobulation as described by the Appellant's specification.

With respect to the Appellant's argument regarding the combination of Katoh and Endo, the Appellant acknowledges that Endo reference does describe and wobulation system, but alleges that the Office Action assumes incorrectly that the teachings of Endo regarding wobulation are relevant to the teachings of Katoh. The Appellant further explains that "once it is understood that Katoh does not teach or suggest a wobulation system, the proposed combination of teachings from Katoh and Endo is clearly unreasonable and would not have been considered by one of skill in the art who would understand that Katoh has nothing to do with wobulation."

However, Examiner respectfully disagrees. As the Appellant expressly admitted, Endo clearly teaches a method of wobulation wherein the sub-frame images are shifted

by a fraction of a pixel to enhance resolution (See Endo: Col. 3, lines 1 – 10 and Figs. 2 and 3). Examiner respectfully asserts that the combination of Katoh and Endo are appropriate since Katoh and Endo both teach shifting images to improve resolution of the display device. Examiner acknowledges that Katoh only describes shifting images by a pixel width instead of a fraction of a pixel. Thereby, Examiner introduced Endo to overcome the deficiency since Endo clearly describes the wobulation technique of shifting subframes by a fraction of a pixel width. The combination of additional sub-frame shifting for an interlaced scanning of Katoh would thereby further improve the resolution.

Therefore, the combination of Katoh and Endo are sufficient and reasonable to overcome the deficiency of shifting subframes by a fraction of a pixel width.

With respect to the Appellant's argument regarding claim 1, the Appellant argues that Katoh does not teach relationship between the fields of an interlaced video signal and the sub-frames generated for wobulation. The Appellant further alleges that Katoh merely mention interlaced video in the context of the color blending technique of Katoh.

However, Examiner respectfully disagrees. As explained in the previously Office Action, Examiner respectfully disagrees with the Appellant with respect to wherein Katoh does not teach any relationship between separate fields of interlaced video and sub-frames subsequently generated for wobulation.

Katoh teaches in Para 0174;

"It should be noted that if the panel is driven by an interlaced scanning technique, the scan lines on the screen are grouped into even-numbered lines/even field and odd-numbered lines/odd field."

In Para 0176;

"It should be noted that in the interlaced scanning technique, an image represented by a field may be processed similarly to an "image frame" as used herein."

As indicated above, Katoh clearly notes that an interlaced scanning technique or a non-interlaced scanning technique can be applied, and in an interlaced scanning technique a field is processed similarly to an "image frame." Since each frame generates sub-frames for wobulation as indicated in Para 0026, each field, which is processed similarly to an "image frame," will generate sub-frames in the similar manner as the "image frames" would. Thus, the cited paragraphs above indicate that the interlaced scanning technique, which is an alternative technique from the described non-interlaced technique in Katoh, teaches separate fields of interlaced video and sub-frames subsequently generated for wobulation as described by Applicant.

Further, Examiner reasserts that the Appellant admits that Endo clearly teaches the wobulation technique in which sub-frames are spatially displayed offset from a previous image sub-frame by an offset distance less than a pixel width.

The combination of Katoh and Endo would have therefore yielded an interlaced wobulation method wherein sub-frames of each even and odd fields are shifted by an offset distance less than a pixel width to achieve higher resolution for the NTSC system of the HD system (Endo: Col. 2, lines 43 – 64).

Therefore, the argument is moot and the previous rejections are maintained.

With respect to the Appellant's argument regarding claims 18 and 36, the Appellant argues substantially similarly to the argument of claim 1.

Therefore, the same reason stated above is sufficient for claim 18.

With respect to the Appellant's argument regarding claim 2, the Appellant argues that the misguided Office Action cites a portion of Katoh (paragraph 0026) that describes the conventional method of generating sub-frames from a *non-interlaced* video frame.

However, Examiner respectfully disagrees, as explained the previous rejection and in the explanation above;

As indicated above, Katoh clearly notes that an interlaced scanning technique or a non-interlaced scanning technique can be applied, and in an interlaced scanning technique a field is processed similarly to an "image frame." Since each frame generates sub-frames for wobulation as indicated in Para 0026, each field, which is processed similarly to an "image frame," will generate

sub-frames in the similar manner as the "image frames" would. Thus, the cited paragraphs above indicate that the interlaced scanning technique, which is an alternative technique from the described non-interlaced technique in Katoh, teaches separate fields of interlaced video and sub-frames subsequently generated for wobulation as described by Applicant.

As noted above, Katoh clearly teaches the interlaced scanning technique and how the sub-frame images are generated.

With respect to the Appellant's argument regarding claim 10, the Appellant argues that does not teach or suggest four image sub-frames generated from the top and bottom fields of an interlaced video frame.

However, Examiner respectfully disagrees. As explained above, Katoh clearly teaches the interlaced method which generates the sub-frames similarly to the method of a non-interlaced scanning method. The non-interlaced scanning method generates two sub-frames per frame. As indicated above, Katoh clearly notes that an interlaced scanning technique or a non-interlaced scanning technique can be applied, and in an interlaced scanning technique a field is processed similarly to an "image frame." Since each frame generates sub-frames for wobulation as indicated in Para 0026, each field, which is processed similarly to an "image frame," will generate two sub-frames per field, which would equate to four sub-frames for an interlaced scanning frame.

With respect to the Appellant's argument regarding claim 12, the Appellant argues substantially similarly to the argument of claim 10.

Therefore, the same reason stated above is sufficient for claim 12.

With respect to the Appellant's argument regarding claim 5, the Appellant argues that Monti's teachings regarding the "pixel values in every other block" have nothing to do with the claimed method of processing every other pixel data element in top field and bottom field, respectively to produce first and second image sub-frames.

However, Examiner respectfully asserts that in response to the Appellant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Further, Examiner respectfully asserts that Monti teaches a processing method of display image data. The combined teachings of Katoh and Endo already teach the pixel data of top fiend and bottom field. Monti was introduced in combination with Katoh and Endo to overcome the deficiency of a signal processing method for a display sub-frames wherein the sub-frames are generated by reading out every other pixel data element to alter the image data. It would have been obvious to apply such method of Monti into Katoh to acquire image data with low amount of memory.

With respect to the Appellant's argument regarding claims 6 and 13, the Appellant argues that Ran does not teach or suggest the claimed averaging of ever two neighboring pixel data elements in each line of respective top and bottom fields to produce first and second image sub-frames.

However, Examiner respectfully asserts that in response to the Appellant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Further, Examiner respectfully asserts that Ran also teaches a processing method of display image data. The combined teachings of Katoh and Endo already teach the pixel data of top fiend and bottom field. Ran was introduced in combination with Katoh and Endo to overcome the deficiency of a signal processing method for a display sub-frames wherein the sub-frames are generated by averaging of every two neighboring pixel data elements in each line of display data. It would have been obvious to apply such method of Monti into Katoh to acquire image data which requires only a fraction of the size of a full frame buffer.

With respect to the Appellant's argument regarding claims 6 – 9, 13 – 16, 24—27, 31 – 34, 40 – 43 and 47 – 50, the Appellant argues that the rejection should not be

sustained for at least the same reasons given above in favor of the corresponding independent claims.

Examiner respectfully asserts that the explanation of the argument regarding the corresponding independents claims has been previously made above.

With respect to the Appellant's argument regarding claim 8, the Appellant argues that none of the cited prior art references teach or suggest generating first and second image sub-frames by computing a function of one or more pixel data elements in respective top and bottom fields of interlaced vide.

However, Examiner respectfully disagrees. As explained in the previous Office Action, the limitations of claim 8 are substantially similar to the limitations of claim 6. The only difference is that claim recites "computing a function of one or more pixel data elements." Examiner respectfully asserts that claim 6 uses a process of averaging every two neighboring pixels. Averaging of two pixels is equivalent to computing a function of one or more pixel data elements.

Therefore, the rejections of the Final Action of the pending claims are proper and should be sustained.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/YONG SIM/

Examiner, Art Unit 2629

Conferees:

/Amr Awad/
Supervisory Patent Examiner, Art Unit 2629

/Amare Mengistu/

Supervisory Patent Examiner, Art Unit 2629